PROC (BAYL UNIV MED CENT)
2021;34(5):642–643

https://doi.org/10.1080/08998280.2021.1937009

Taylor & Francis
Taylor & Francis Group

Propofol 2%: understanding a new concentration of a well-known medication

Betsy A. Regier, MD[a,b], Tricia A. Meyer, PharmD[b,c], and Russell K. McAllister, MD[a,b]

[a]Department of Anesthesiology, Baylor Scott & White Medical Center – Temple, Temple, Texas; [b]Department of Anesthesiology, Texas A&M College of Medicine, Temple, Texas; [c]Department of Pharmacy, Baylor Scott & White Medical Center – Temple, Temple, Texas

Demand for critical care medications dramatically increased during the COVID-19 pandemic, particularly for patients needing prolonged intubation and deep sedation. Propofol 1%, being the preferred sedation drug in this setting, was in high demand, creating a drug supply disruption for many hospitals throughout the United States. The propofol shortage is still ongoing. In response, the Food and Drug Administration (FDA) issued an emergency use authorization for the use of double concentrated propofol 2% (Propoven). Clinicians should be aware of the key similarities and differences between these two formulations of propofol. Both propofol 2% and 1% contain the same active drug, formulated in a lipid emulsion, white in color, and come in 100 mL clear glass vials. Given these similarities, a look-alike mix up may occur if both agents are available, increasing the risk of an unintentional overdose.

Propofol 2% differs from propofol 1% in several ways, including its lack of ethylenediaminetetraacetic acid (EDTA), which is an antimicrobial agent added to propofol 1% to decrease bacterial growth in this lipid-rich medication. A study evaluating the potential for bacterial growth in propofol 2% found that, when contaminated directly, propofol 2% allowed bacterial growth. However, when drawn aseptically into syringes, no bacterial growth was found after 24 hours.[1] Given the lack of antimicrobial additive and the potential for bacterial growth, strict aseptic techniques must be used when administering propofol 2%, and it is recommended that both medication and infusion tubing be discarded every 12 hours.[2]

In contrast to propofol 1%, which contains only long-chain triglycerides, propofol 2% contains both medium- and long-chain triglycerides. In animal studies, continuous infusions of medium-chain triglycerides in pregnant subjects have been shown to increase the risk of fetal neural tube defects and embryo abnormalities. Given this potential risk of fetal harm, propofol 2% should not be used for pregnant patients unless no other FDA-approved medication is available.[2]

Propofol 1% is prepared in a 10% intralipid emulsion, containing 0.1 g fat/mL. Propofol 2% has half the lipid load when compared to propofol 1%, which likely accounts for its lower incidence of hypertriglyceridemia after prolonged infusions. One study comparing serum triglycerides after 2-, 4-, and 6-hour infusions of 1% and 2% propofol found a significant increase in serum triglycerides with propofol 1% and no increase with propofol 2%.[3] Another study evaluated the incidence of hypertriglyceridemia after prolonged propofol infusions in the critical care setting and found an incidence of 3.9% with propofol 2% compared to 20.4% with propofol 1%.[4]

Propofol 2% is manufactured in Germany and its barcodes may not work correctly with US scanning systems. Special care must be taken at each facility to properly label each vial to ensure that the correct medication concentration is being used.[5] Propoven 2% is approved for use in the European Union but not in the US. The barcode used is an international code, and there are no plans to change the current Propoven 2% barcodes (A. Lindsey, personal communication). Additionally, propofol 2% should be added to both infusion pump and electronic health record libraries to decrease the incidence of medication errors.[6]

With the similarities and key differences between formulations of propofol 2% to propofol 1%, and the recent emergency use authorization of this new double concentrated formulation, understanding of these issues is critical to help to minimize the risks that may be associated with the new formulation.

Corresponding author: Betsy A. Regier, MD, Department of Anesthesiology, Baylor Scott & White Medical Center – Temple, 2401 S. 31st, Temple, TX 76508 (e-mail: betsy.regier@bswhealth.org)

The authors report no conflict of interest.

Received May 12, 2021; Revised May 26, 2021; Accepted May 27, 2021.

ORCID
Betsy A. Regier http://orcid.org/0000-0002-2400-8301
Russell K. McAllister http://orcid.org/0000-0002-3762-0145

1. Erden IA, Gülmez D, Pamuk AG, Akincia SB, Hasçelik G, Aypar U. The growth of bacteria in infusion drugs: propofol 2% supports growth when remifentanil and pantoprazole do not. *Braz J Anesthesiol*. 2013;63(6):466–472. doi:10.1016/j.bjane.2012.10.003.
2. US Food and Drug Administration. Propoven 2% fact sheet for health care providers. https://www.fda.gov/media/137889/download. Accessed May 15, 2021.
3. Sato K, Kamii H, Kato M. Effect of 1% and 2% propofol in MCT/LCT emulsion on serum lipids. *J Neurosurg Anesthesiol*. 2006;18(4):301.
4. Barrientos-Vega R, Sánchez-Soria MM, Morales-Garcia C, Cuena-Boy R, Castellano-Hernández M. Pharmacoeconomic assessment of propofol 2% used for prolonged sedation. *Crit Care Med*. 2001;29(2):317–322. doi:10.1097/00003246-200102000-00018.
5. Truitt E, Thompson R, Blazey-Martin D, NiSai D, Salem D. Effect of the implementation of barcode technology and an electronic medication administration record on adverse drug events. *Hosp Pharm*. 2016;51(6):474–483. doi:10.1310/hpj5106-474.
6. Ohashi K, Dalleur O, Dykes PC, Bates DW. Benefits and risks of using smart pumps to reduce medication error rates: a systematic review. *Drug Saf*. 2014;37(12):1011–1120. doi:10.1007/s40264-014-0232-1.

Avocations

Jackson Lake is part of the Grand Teton National Park. It is a natural lake, remnant of a glacial and fed by the Snake River. Photo taken by Alejandro C. Arroliga, MD, with a Nikon D 7100, Iso 1100, 22 mm, F 20, 1/1000. Dr. Arroliga (Alejandro.Arroliga@BSWHealth.org) is chief medical officer of Baylor Scott & White Health and dean of the Texas A&M School of Medicine's regional campus in Temple, Texas.